

Building Gulf Coast Resilience

Opportunities After Deepwater Horizon



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Building Gulf Coast Resilience: Opportunities After Deepwater Horizon

The Deepwater Horizon Spill and the Restoration and Resilience Opportunity

The Gulf Coast states of Texas, Louisiana, Mississippi, Alabama, and Florida are in the midst of one of the biggest coastal restoration efforts in the nation's history: a restoration that was precipitated by one of the worst environmental catastrophes in the nation's history. On April 20, 2010, the Deepwater Horizon (DWH) Macondo oil drilling platform, located 40 miles off the Louisiana coast, exploded and sank, killing 11 people and causing more than 134 million gallons (4 million barrels) of crude oil to be released into the Gulf of Mexico.¹ Oil spread throughout the Gulf, covering 43,300 square miles and affecting 1,300 miles of coastline from Texas to Florida,² home to important coastal ecosystems, habitats, fisheries, and recreation and tourism economies, and people whose lives are intertwined with their rich coastal heritage and resources.

In addition to the oil spill, the Gulf Coast region faced many pre-existing environmental stressors, which make the ongoing restoration efforts in this

region even more important and difficult. Installation of levees, dredging of canals, and laying of oil pipelines have contributed to erosion and land loss in coastal Louisiana. Oil extraction, the draining of marshlands, and groundwater retrieval have also contributed to land subsidence in the region. For example, in Texas, past demand for groundwater contributed to between one to ten feet of subsidence around Galveston Bay.³ Nutrients and other pollutants delivered to the Mississippi-River Delta from the Midwest have degraded water quality and contributed to harmful algal blooms in the Gulf, further harming wetlands and marine ecosystems and species. Throughout the Gulf, fisheries and the coastal reefs upon which many depend are similarly being affected by nutrient and pollutant runoff, in addition to disease, overexploitation, and invasive species.⁴

These impacts are being exacerbated by rising sea levels and coastal storms that are contributing to erosion and coastal land loss throughout the region. The Southeast is particularly vulnerable to climate change impacts due to a disproportionate number of the fastest growing urban areas in the country, important economic sectors located in low-lying coastal areas, and rapid changes in land use and cover.⁵ Counties and parishes in Alabama, Mississippi, Louisiana, and Texas face significant

annual losses (to the year 2010) that average \$14 billion from hurricane winds, land subsidence, and sea-level rise.⁶ By 2030, future projected annual losses in the region could range from \$18 to 23 billion (depending on the potential increase in the frequency and severity of hurricanes and rising sea levels).⁷ Two Gulf ports — New Orleans, Louisiana and Mobile, Alabama — are among both the top ten areas most vulnerable to sea-level rise and the top 25 ports in the nation (based on total volume of imports and exports).⁸ Moreover, coastal Louisiana is considered one of the U.S. regions that faces the greatest risks from the impacts of extreme storms, sea-level rise, and coastal land loss from climate change.⁹ Louisiana alone has lost 1,880 square miles since 1932.¹⁰ Climate change poses an existential threat to coastal communities throughout the region, communities that were once protected by acres of buffering wetlands. As a result of these cumulative threats to Gulf Coast communities and economies, there is an urgent and compelling need for rapid action to restore the Gulf Coast ecosystems that support both.

Although the primary purpose of Deepwater Horizon recovery efforts is to restore ecosystems and economies affected by the oil spill, Gulf Coast states also have a unique opportunity to demonstrate the value of large-scale restoration projects for effectively reducing coastal flood risks while rehabilitating important coastal ecosystems. More than \$20 billion in funding will flow to the region over 15 years to implement ecosystem and economic restoration projects as a result of the Deepwater Horizon oil spill settlement.¹¹ This funding presents an opportunity to deliver innovative, holistic restoration projects that can enhance the environmental and economic resilience of the Gulf Coast region — improving its ecosystems, habitats, communities, and industries. And these projects present an opportunity to demonstrate the resilience benefits (risk reduction, environmental, economic, and social) that can be delivered with

ambitious, science-based, and ecosystem-scale coastal restoration projects. But these projects also present many challenges in terms of their scope, the number of state and federal agencies involved, the range of habitats and uses included, and the innovative approaches being proposed to restore natural habitats.

As home to some of the most vulnerable coastal communities in the country, the Gulf Coast is the proverbial “canary in the coal mine” for U.S. coastal communities that are anticipating and experiencing more intense coastal storms, sea-level rise, erosion, and land loss. The region has a unique opportunity to both restore spill-affected ecosystems and enhance community resilience to the impacts of climate change. And the region’s success or failure in restoring ecosystems to enhance coastal resilience can either serve as a model for other coastal communities or as a cautionary tale of the challenges and obstacles to building coastal resilience through ecosystem restoration. As a result, all levels of government — local, state, and federal — will need to work together with the private sector to ensure the successful and timely implementation of these projects. This report was developed to provide recommendations regarding opportunities for state and federal agencies to improve coordination, speed delivery of restoration projects, and enhance project outcomes, including climate resilience benefits. The recommendations in this report were informed by three case studies of how other regions and agencies worked to improve coordination and other processes, including case studies of the Hurricane Sandy recovery efforts in New York and New Jersey, the California WaterFix project in the Sacramento-San Joaquin River Delta, and the Long-term Experimental and Management Plan for the Glen Canyon Dam in the American West. These three case studies accompany this report.



The National Importance of Gulf Coast Restoration

This grand experiment in coastal restoration holds importance beyond the boundaries of the Gulf Coast region. Not only will the lessons from the Gulf restoration efforts inform other coastal communities, but restoration efforts in the Gulf region will also affect the nation economically and environmentally.

The nation's economic well-being is dependent upon the resilience of this region: Gulf Coast states are home to approximately 70 million people (with 22 million people living in coastal counties and parishes) and the Gulf economy contributes \$234 billion to the nation's gross domestic product (GDP) and supports millions of jobs.¹² Louisiana alone supplies 25 percent of the nation's oil supply and processes 20 percent of all goods shipped to the United States through

major ports.¹³ For example, it is estimated that if Port Fourchon in Louisiana closed for more than two weeks, 250,000 people could lose their jobs nationwide.¹⁴ The Mississippi River is also an important waterway and port system running along ten states that connects the Gulf to the Midwestern states that rely on the Mississippi River and Gulf Coast ports to transport agricultural products.¹⁵ The River generates nearly \$500 billion in annual revenue, supports 1.5 million jobs, and transports 40 percent of the nation's total agricultural output.¹⁶ It is estimated that a shutdown of shipping traffic on the River would cause \$300 million in economic losses to the nation per day of closure.¹⁷

In 2014, the Gulf's "ocean economy" — including the industries of marine construction, offshore mineral extraction, tourism and recreation, living resources, ship and boat building, and marine transportation — accounted for 3.1 percent of the total employment and 6.7 percent of total GDP in the region.¹⁸ That year, the Gulf (compared to other regions) contributed the highest percentage

Port Fourchon,
Louisiana.

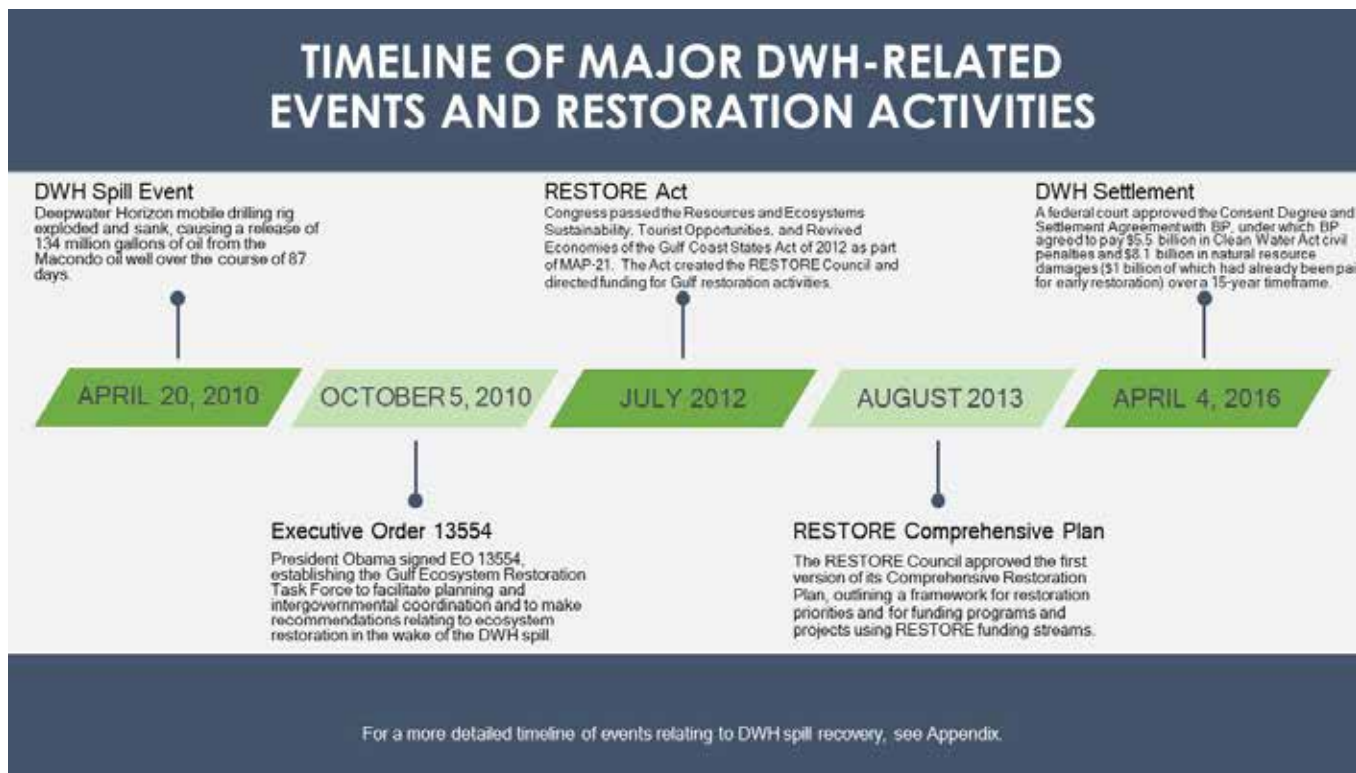
Credit: Tim Carruthers, Integration and Application Network, University of Maryland Center for Environmental Science (ian.umces.edu/imagelibrary/).

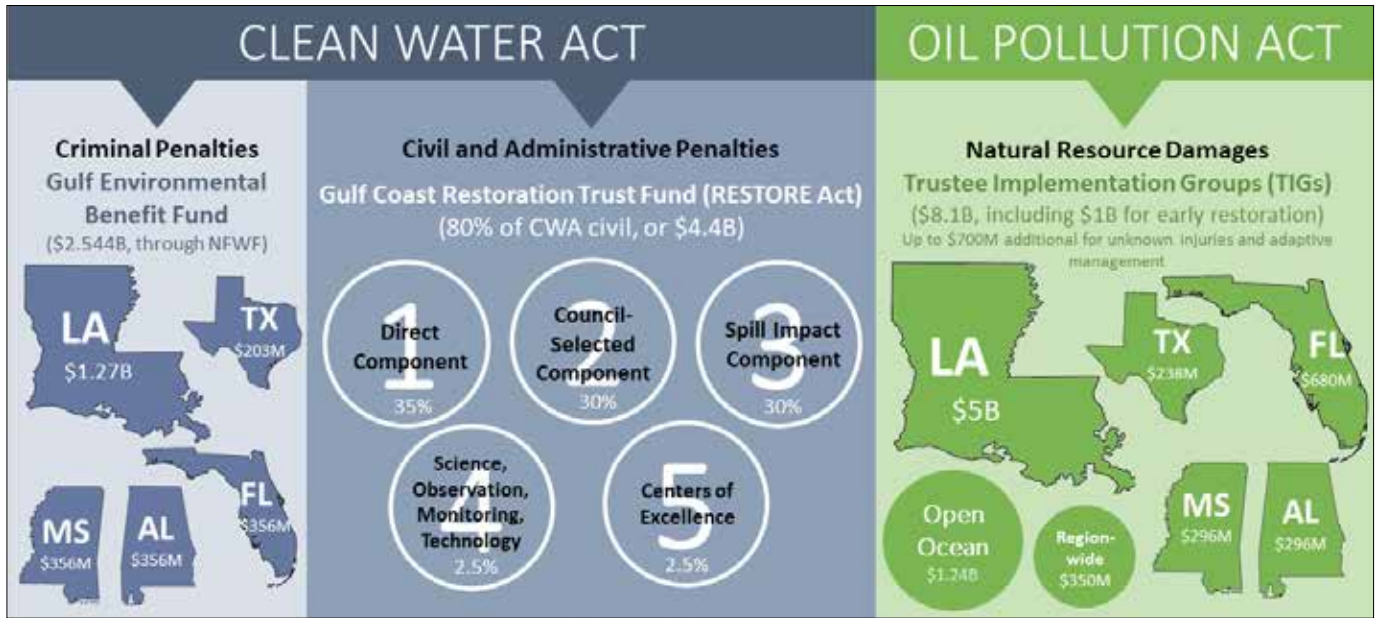
of GDP in the entire U.S. ocean economy (47.3 percent). Among the five Gulf states, Texas was the largest contributor as measured by GDP, and Florida’s Gulf counties employed the greatest share of ocean-related workers (38.8 percent) due in large part to the state’s large tourism and recreation sector.¹⁹

The nation’s environmental well-being is also dependent upon the health and sustainability of Gulf Coast ecosystems and habitats. The Gulf Coast is home to some of the most biologically important marine ecosystems in the country and provides habitat to 15,000 different species, 130 of which are federally listed protected species.²⁰ The region produces 14 percent of U.S. seafood including 83 percent of shrimp and 56 percent of oysters.²¹ Gulf habitats and coastal resources — such as marshes, mangrove forests, barrier islands, sandy beaches and dunes, and deep-ocean corals — also provide important environmental and flood risk

reduction benefits. However, these ecosystems have been affected by both the recent oil spill and other man-made and natural long-term stresses including flood control structures, oil extraction, repeated coastal storms, gradual subsidence and erosion, impaired water quality, changing salinity, and rising sea levels.²²

Thus, the work being undertaken to rebuild and restore coastal ecosystems not only affects the Gulf Coast region, but also the nation as a whole. The national importance of this work requires urgent action and new and improved approaches for designing, building, reviewing, and permitting coastal restoration projects. Federal agencies should learn from this experiment to improve federal processes in ways that will ensure that other states and communities can implement similar ambitious nature-based projects as strategies for enhancing coastal resilience.





Funding Sources for Deepwater Horizon Restoration.

This chart summarizes the majority of funds provided to the states for restoration pursuant to the consent decree and criminal plea agreements. To simplify, some smaller funding sources are not shown here. Credit: Created by the Georgetown Climate Center summarizing penalty amounts from the British Petroleum Consent Decree and information about the criminal plea agreements on the National Fish and Wildlife Foundation website on the Gulf Environmental Benefit Fund

DWH Restoration Efforts

Since 2011, state and federal agencies have been working to develop plans and projects to restore Gulf Coast resources and ecosystems. Several processes were initiated to facilitate and fund restoration efforts across all five states:

- **RESTORE** – In 2012, Congress passed the RESTORE Act,²³ establishing the RESTORE Council²⁴ and the Gulf Coast Ecosystem Restoration Trust Fund. Most of the Clean Water Act penalties arising from the DWH spill (\$5.5 billion) will be allocated through the RESTORE Act, which creates five “buckets” of funding for different uses. Thirty-five percent (\$1.86 billion) of the funds will be directly allocated in equal shares to each of the states for uses specified in the statute.²⁵ Thirty percent (\$1.6 billion) will be directed to Council-selected projects consistent with the Council’s Comprehensive Plan.²⁶ Another thirty percent (\$1.6 billion) will be allocated to the states

applying a formula based upon the impact of the spill on that state.²⁷ The remaining five percent of the funds will be used to support scientific research.²⁸

- **NRDA** – Another \$8.8 billion in funding will flow to the region based upon the Natural Resources Damage Assessment (NRDA)²⁹ that was conducted pursuant to the Oil Pollution Act.³⁰ NRDA funds are administered by seven Trustee Implementation Groups (TIGs, one for each state, a region-wide TIG, and an open-ocean TIG).³¹ NRDA funds must be applied to projects that directly address the injury the oil spill caused to coastal resources. The final Programmatic Damage Assessment and Restoration Plan (PDARP) guides restoration activities with NRDA funds, and restoration plans and funding decisions must be consistent with the re-

gion-wide PDARP, which emphasizes large-scale ecosystem-based restoration and adaptive management.

- **NFWF** – A third source of funding (\$2.544 billion) is being administered through the National Fish and Wildlife Foundation (NFWF),³² which is prioritizing planning and pre-project engineering and design.

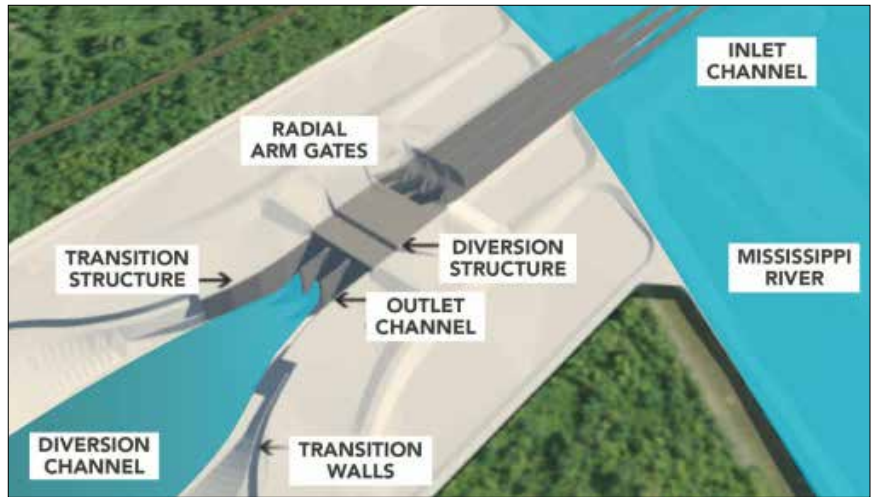
Along with federal agencies, the five Gulf Coast states (and local governments in Florida) will also have an important role in selecting and implementing many of the restoration projects. Since the spill, each of the states has taken steps to develop restoration plans and many restoration projects are underway.³³ Each state is focusing on different priority watersheds and habitats and is pursuing different types of economic and ecosystem restoration projects to achieve state-specific goals.

Example Gulf Coast Restoration Projects

The ongoing planning and project implementation efforts in each state are further discussed in Appendix D.

Texas is pursuing upland projects to acquire and restore 4,000 acres of riparian corridors along major waterways in Harris County and Houston, which were devastated by Hurricane Harvey in 2017, through the “Bayou Greenways” project. The project will help to improve water quality in the Houston-Galveston Bay, enhance habitats, and reduce flood risks for the region.

Bayou River, Houston, Texas.
Credit: Trong Nguyen, Shutterstock



Sediment Diversion Projects in Louisiana. Credit: Louisiana Coastal Protection and Restoration Authority

Louisiana is using DWH funding to advance land-building projects like the construction of sediment diversions in the Barataria Bay and Breton Sound. Once completed, the projects will divert silt and sand being carried down the River to replenish sediments and rebuild marshes in the Barataria Bay and Breton Sound by creating a channel in the Mississippi River levee. When the levee system was created, it directed sediments out into the Gulf of Mexico, depriving Delta ecosystems of the resources needed to build and maintain wetlands. Canals built to expedite oil and gas activities, as well as hurricanes, sea-level rise, and impacts from the oil spill have all degraded the marsh grasses and wetlands that historically characterized these watersheds. The purpose of the diversion projects is to reintroduce sediments and rebuild coastal wetlands in these areas to enhance ecosystems and natural storm surge buffers for neighboring communities.



Deer Island Beneficial Use Project. Credit: Mississippi Department of Marine Resources

Mississippi is funding projects to utilize dredge spoils to rebuild marshes and barrier islands. The \$3 million Deer Island project will use dredge materials to create 40 acres of tidal wetlands and a 7-foot sand berm, restoring critical habitat for the Gulf Sturgeon and dampening storm surges into Biloxi Bay.



Bon Secour Marsh. Credit: U.S. Fish and Wildlife Service

Alabama is using dredged sediments to restore 1,200 acres of estuarine habitats and wetlands in Upper Mobile Bay and to acquire high-priority, undeveloped parcels in the City of Mobile including riparian, wetland, and upland habitats. This state is also pursuing projects to rebuild barrier islands and build living shorelines that will dampen storm surges, reduce shoreline erosion, and enhance habitats in the Bon Secour National Wildlife Refuge, and is working to acquire 251 acres of high-priority conservation land for inclusion in the Refuge.



Florida is supporting habitat restoration in Pensacola Bay, which provides habitat to over 200 species of fish and shellfish, including threatened and endangered species. The state is using DWH funding to build a 24,800 foot oyster reef breakwater system to enhance habitats in the Bay, remove contaminated sediment, and treat stormwater and wastewater to improve water quality.

Florida Pensacola Bay Living Shoreline Project. Credit: Florida Department of Environmental Protection

Challenges

Implementing the ambitious portfolios of restoration projects in each of the five states affected by the spill will be a challenging enterprise that will require unprecedented coordination across federal agencies and between levels of government. Although states are playing an important role in implementing restoration projects, federal agencies also have critical roles to play, which could either help or hinder delivery of projects. In addition to administering the funding, federal agencies are responsible for completing timely environmental review under the National Environmental Policy Act (NEPA),³⁴ and for issuing permits under a variety of federal statutes that will be triggered by many of these projects (e.g., Clean Water Act,³⁵ Rivers and Harbors Act,³⁶ Endangered Species Act,³⁷ Marine Mammal Protection Act,³⁸ Magnuson-Stevens Fishery Conservation and Management Act,³⁹ and National Historic Preservation Act⁴⁰). Because of the scale of the restoration efforts that will happen in the region, new approaches may be needed to manage the challenges that will be raised by this ambitious experiment in coastal restoration.

This work will require state and federal agencies to navigate four primary challenges:

- **Interagency coordination** — To align the different funding streams and to complete environmental review and permitting, DWH projects will require significant levels of coordination among federal agencies and between levels of government and even among states.
- **Funding** — \$20.8 billion in funding will flow to this region incrementally over a 15-year period and will be allocated through a variety of different programs⁴¹ with different rules and limitations and administered through different processes. This will make it much more challenging for project proponents to align different funding streams and deliver comprehensive, large-scale projects in the near term. The different funding programs are further explored in Appendix B.
- **Environmental review and permitting** — The projects being considered are complex, and many will trigger regulatory and environmental review under a variety of different federal statutes.⁴² This will require coordination across federal agencies, which will be difficult and may slow project implementation, but if used strategically might result in the design of better-planned projects with broader public support. Moreover, it is important to note that governing statutes and regulatory regimes, including the National Environmental Policy Act, do not distinguish or allow for the streamlined review of projects whose primary purpose is to benefit the environment, like many DWH projects. Environmentally beneficial restoration projects can undergo the same review process as those for more harmful infrastructure projects. The environmental review and permitting requirements for DWH projects are further explored in Appendix C.
- **Changing environmental conditions** — Current legal regimes were also not developed in the era of climate change or resulting habitat or species migration and, therefore, often inadequately account for changing environmental conditions. To deliver projects that will be sustainable over the long term, proponents will need to design projects using the best available science on future sea-level rise and coastal land loss in this region. Additionally, adaptive management regimes will need to be used to both minimize the impacts from these projects and ensure the long-term viability of these projects as sea levels rise. Federal agencies will play a role in authorizing and helping to develop adaptive management and monitoring approaches for complying with these statutes and minimizing environmental harms.

This report is intended to identify opportunities to help state and federal agencies avoid and overcome these challenges by applying lessons gleaned from other large-scale infrastructure projects that are navigating similar challenges.

Summary of Case Studies

Subsequent chapters present three case study examples of different approaches that state and federal agencies are taking to move large-scale projects forward. These examples are not without their own flaws, nor is work on these projects complete, but these case studies highlight practices that state and federal agencies have used to improve coordination, expedite environmental review and permitting, and to address changing environmental conditions. In the spirit of learning, these projects present useful lessons for making progress in the Gulf Coast region.

- **Sandy Recovery Coordinating Teams** — This case study explores interagency “coordinating teams” that were set up and administered by the Department of Housing and Urban Development (HUD) and Federal Emergency Management Agency (FEMA) to improve and expedite Hurricane Sandy recovery projects. The teams helped agencies coordinate funding from a variety of different disaster-aid programs. They provided a venue for state and local grantees to obtain early feedback on the design of recovery projects to minimize permitting barriers and to streamline the environmental review process. The federal agencies have benefitted from this model so much that they expressed a desire to continue using the “coordinating team” model, even after disaster recovery efforts are completed.
- **California WaterFix** — The State of California is working to construct twin tunnels from the Sacramento River to improve delivery of water

to California residents and agricultural users, while reducing the environmental impacts from the current water delivery system that pumps water out of the ecologically-sensitive Sacramento-San Joaquin River Delta. This case study explores how interagency coordination and early and frequent consultations among state and federal agencies helped the project designers address regulatory challenges and expedite environmental review. It also explores how the California WaterFix project was designed to account for climate change and how the NEPA process was used to assess adaptive management approaches for minimizing project impacts given future climate projections.

- **Glen Canyon Dam Long-term Experimental and Management Plan** — The Bureau of Reclamation (Reclamation) adopted a Long-term Experimental and Management Plan for managing the operations of the Glen Canyon Dam in Arizona. The plan applies an adaptive management approach for minimizing conflicts among interests affected by dam operations, including hydroelectric power generation, water supply and allocations, habitats and species in the Colorado River ecosystem, recreational uses of the Colorado River, and cultural and archaeological sites important to Native American Tribes in the region. This case study explores how Reclamation instituted a defined adaptive management structure, supported by long-term research and monitoring and stakeholder engagement, to minimize conflicts and comply with different laws.

The following section draws lessons from these case studies that could be used to inform restoration efforts in the Gulf Coast states. Several common themes emerge from these case studies, but in each example, the agencies involved took somewhat different approaches, which provide a range of options for how state and federal agencies can pursue similar goals of improving coordination and streamlining administrative processes.

NRDA Trustees’ Definition of Adaptive Management

“Adaptive management is a form of structured decisionmaking applied to the management of natural resources in the face of uncertainty. It is an iterative process that integrates monitoring and evaluation of management actions, where adjustments are made to management approaches based upon observed outcomes. Within the context of ecological restoration, adaptive management addresses uncertainty hindering restoration decisions by linking science-based approaches to restoration decisionmaking.”⁴³

Opportunities and Lessons

Interagency Coordination

Create venues for facilitating interagency coordination.

In addition to the bodies that already coordinate around specific funding programs (like the RESTORE Council and the NRDA Trustee Implementation Groups), teams could be set up to enable interagency coordination across funding programs and include agency experts with specific restoration or ecosystem expertise. Similar to the approach that was taken to facilitate Hurricane Sandy recovery efforts, “coordinating teams” could be established in each state to help agencies align DWH funding for projects and streamline environmental review and permitting. These teams could bring together federal partners across all of the funding programs (RESTORE, NRDA, NFWF) to meet regularly with state and local project proponents. The teams could work to refine restoration approaches and identify the best sources of funds to support implementation of individual projects in a watershed. They could also provide technical assistance and guidance to project proponents to help them design projects to be sustainable given long-term projections of sea-level rise and coastal land loss. As was demonstrated by the Sandy coordinating teams, it is helpful to have an agency on point to organize and administer these meetings to ensure their success. But with a limited dedication of staff time, federal agencies can increase their efficiency, reduce duplication of effort, and be better partners to their state and local counterparts. With the Sandy recovery, states also set up their own coordinating teams to facilitate coordination among state agencies and with local governments; this approach could also be applied at the state level to facilitate state coordination around DWH projects and implementation.

Create work plans to formalize coordination.

Looking back on Sandy recovery, state and local grantees suggested that if they had the opportunity to suggest improvements to the coordinating team model, they would have met earlier with federal agencies to establish work plans, timelines, and milestones. Early meetings can be critical for setting clear expectations about the data collection, sampling, field studies, and modelling that will be needed to complete environmental review and permitting. Work plans can also help federal agencies get on the same page about environmental review roles and the staging of review among the agencies. Work plans can help all parties set a clear road map of roles, responsibilities, timelines, and the studies and reviews that need to be completed to get the project over the finish line.

Participants in some of the more complex projects have worked to develop formal memoranda of understanding (MOUs) between state and federal agencies, which serve the same purpose as a work plan. However, going through the process of getting signatures on a formal MOU can be time consuming and some states have opted for a less formal approach. For example, with the California WaterFix, the state opted not to seek a formal agreement, but informally agreed to an accelerated environmental review and permitting timeline. Standing meetings were used to get state and federal agency officials on the same page about needed data collection and technical studies, to report on progress, and address issues in a timely fashion. A formal MOU was used, however, for the California High Speed Rail project, to lay out the roles, responsibilities, and timelines for staging decision-making across state and federal agencies. Both a formal MOU and a less formal work plan can help to create a common timeline for moving a project through environmental review and permitting and to facilitate coordination among agencies.

Louisiana MOU for the Mid-Barataria Sediment Diversion Project

In January 26, 2018, Louisiana and seven federal agencies signed a memorandum of understanding (MOU)⁴⁴ where all parties agreed to strive to complete environmental review and permitting for the diversion project on an expedited timeline, in accordance with applicable law, under a “One Federal Decision” framework.⁴⁵ Under the framework, federal agencies with jurisdiction over the project will proceed concurrently, rather than consecutively, through the environmental review process, as coordinated by one “lead” agency. Originally, regulators estimated that it could take between five to eight years to complete environmental review and permitting for this project.⁴⁶ As a result of the MOU, that timeline has been reduced, tentatively allowing all review and permitting decisions to be finalized by 2020.⁴⁷ The timeline for the sediment diversion project was also expedited by recent federal legislation that issued a waiver from permitting requirements under the Marine Mammal Protection Act (MMPA) for the diversion projects.⁴⁸

Funding

Align funding to ensure more comprehensive restoration projects.

To ensure holistic restoration approaches at the watershed scale, the federal agencies administering DWH funding will need to coordinate with each other and the states to ensure that a complementary suite of projects are being funded in priority watersheds across all funding programs. Similar to the Sandy approach, “coordinating teams” could help agencies align DWH funding streams, identify complementary projects, and coordinate the sharing of data or identify complementary studies and environmental analyses that can be used to complete environmental review of a project or suite of projects. Already, the RESTORE Council is seeking to enable this kind of collaboration by providing funding specifically for coordination among Council members and stakeholders within the region, as well as across restoration funding streams.⁴⁹

The RESTORE Council’s Comprehensive Plan also recommends “collaboration workshops,” which could be pursued in priority watersheds to help states develop comprehensive suites of restoration projects, link complementary projects, and identify appropriate funding sources to implement individual projects.⁵⁰ Workshops could also bring

in experts from non-profit organizations, academia, Centers of Excellence, and even the private sector to support the design and selection of projects that will bring the greatest return on investment for affected watersheds.

Stage funding or create financing mechanisms to enable implementation of larger-scale projects over longer timeframes.

Because the DWH settlement funding is allocated over the course of a 15-year payment schedule, there is risk that the funds will be used to support only smaller-scale projects as the funds slowly flow to the region. The RESTORE Council is already letting funds accumulate so that it can support larger, more comprehensive projects. While this approach may be politically challenging where elected officials are eager to see projects implemented and funding flowing to their regions as quickly as possible, a longer-term, comprehensive approach has the potential to result in projects that deliver better environmental outcomes. Additionally, the Council (and other entities administering funds, such as NFWF) can continue to encourage and fund projects allowing grantees to stage project implementation by using early allocations to pay for planning, design, and feasibility analyses. This will enable the states and other project implementers to develop and design more ambitious, comprehensive projects with early flows of funding, and future

allocations of funds can be used later to support permitting and construction. In the California WaterFix example, agencies have staged the project such that construction can begin on some components of the project while later stage components are still undergoing design and review stages.

Additionally, financing options could be pursued to allow the Gulf Coast states to borrow against future allocations of funding that are guaranteed to flow to the state pursuant to the terms of the settlement agreement. This would allow states to implement larger-scale restoration projects on faster timelines than would be allowed under the settlement agreement's 15-year payment schedule. For example, Congress could enact legislation authorizing states to borrow against future settlement proceeds. If the U.S. Department of the Treasury committed to backing private loans made to the states to advance restoration work, states could access private capital to support work now at very low interest rates.⁵¹

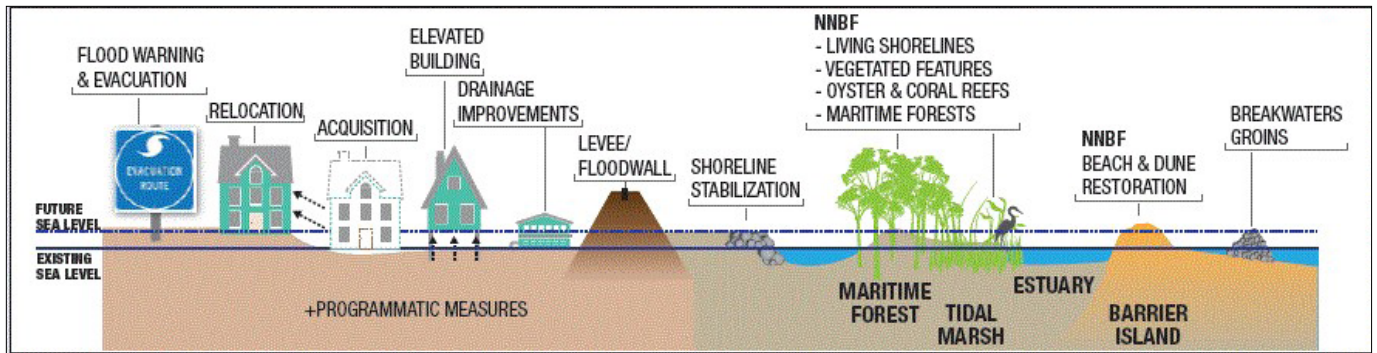
Link restoration with broader resilience and disaster-recovery efforts.

Coastal ecosystem restoration is increasingly being touted as a strategy for reducing flood risks and enhancing the resilience of coastal communities. ("Resilience" in this report is defined as a system's or a community's ability to quickly bounce back and recover from a disruption).⁵² Wetlands, barriers islands, and oyster reefs, among other natural and nature-based features, can dampen storm surges and reduce flood risks to inland communities.⁵³ Because many of the same Gulf Coast states hit by oil-spill impacts were also affected by recent coastal storms, efforts could be made to ensure recovery efforts are linked with and complementing DWH restoration efforts. Coastal resilience will not be achieved in the Gulf Coast region with the DWH funding and coastal restoration projects alone. To pursue a more comprehensive approach

for enhancing the physical, environmental, social, and economic well-being of coastal communities in these five states, states will need broader visions and plans for implementing a multiple lines of defense approach aligning nature-based approaches and ecosystem restoration efforts at the water's edge with inland land-use strategies for reducing flood risks to the built environment. Efforts should be made to align coastal restoration being pursued with DWH funds with these broader state efforts to recover from recent storms and to reduce risks posed by future storms.

To do so, states could integrate coastal restoration efforts into existing disaster-recovery or land-use plans or develop comprehensive coastal resilience plans that connect coastal restoration efforts with upland strategies for reducing flood risks in coastal communities. Such planning efforts could be used to not only align DWH restoration funding sources and projects, but also to identify other projects and funding opportunities for implementing additional resilience-building activities in adjacent communities and inland areas.

These plans could also help states ensure that disaster-recovery projects from recent storms — like Hurricanes Harvey and Irma — are complementing and supporting DWH restoration efforts. For example, Texas's efforts to buy out properties and restore stream corridors and bayous in Houston and Harris County with disaster-aid funding would be beneficial from a flood risk reduction standpoint, but such projects could also improve water quality in the Houston-Galveston Bay benefiting DWH restoration efforts in this watershed. And Houston's work to adopt a stronger flood-plain ordinance will ensure that the city's built environment is also more resilient to future flood impacts.⁵⁴



Multiple Lines of Flood Defenses.

Credit: U.S. Army Corps of Engineers

Louisiana’s Efforts to Build Coastal Resilience

Efforts in Louisiana provide a model for a comprehensive and integrated approach to coastal resilience and disaster recovery. The Louisiana Coastal Protection and Restoration Authority, which was established in the wake of Hurricanes Katrina and Rita, develops and updates the Louisiana Coastal Master Plan (CMP) every six years. The CMP calls for the use of “non-structural strategies” that can provide resilience and flood-risk-reduction benefits, such as elevating homes and adopting land-use practices to ensure that development in communities is more resilient to flood impacts.⁵⁵ The state actively seeks to align restoration funding and other planning efforts (e.g., those required to secure DWH-related funds) with the priorities laid out in the CMP. And the CMP specifies that the state will use DWH funding to implement projects from the CMP and align those investments with other funding sources coming to the state.⁵⁶ To implement the CMP and take in DWH settlement funding, the state also created a dedicated Coastal Protection and Restoration Fund,⁵⁷ and state law specifies that the funds may only be used for projects and programs that are consistent with the CMP.⁵⁸ Additionally, in April 2016, Governor John Bel Edwards signed Executive Order JBE 2016-09,⁵⁹ requiring all state agencies, departments, and offices to “administer their regulatory practices, programs, projects, contracts, grants, and all other functions vested in them in a manner consistent with the Coastal Master Plan and public interest to the maximum extent possible.”⁶⁰

Louisiana is also developing innovative strategies for reducing risks to coastal communities. As one of the winners of the National Disaster Resilience Competition,⁶¹ the state received \$92.6 million dollars to implement the Louisiana Strategic Adaptations for Future Environments (LA-SAFE) program and to relocate the tribal community of Isle de Jean Charles.⁶² Through the LA-SAFE project, the state is developing model strategies for investing in “higher ground” communities to facilitate resettlement away from the most vulnerable areas of the coast.⁶³ The lessons from LA-SAFE can be used to inform future updates to the “non-structural” recommendations in the CMP and to ensure that the investments being made by other state agencies, including disaster-recovery investments, are aligning with and complementing efforts to restore coastal ecosystems through the CMP.

Environmental Review and Permitting

Consider expedited processes for reviewing and permitting projects where the sole purpose is to restore the affected environment.

The governing statutes and regulatory regimes, including the National Environmental Policy Act, do not distinguish or allow for the streamlined review of projects where the sole purpose of the project is to restore the affected environment, like many DWH projects. In other words, environmentally beneficial restoration projects can undergo the same review process and timelines as those for more harmful “gray” infrastructure projects. An expedited process could be created for ecosystem restoration projects that will deliver important environmental benefits and remedy environmental harms.

Use environmental review to improve project outcomes.

NEPA provides an important framework for evaluating the potential impacts of projects and also educating the public about those impacts and how they will be addressed. Projects that do not transparently address potential impacts can face political and even legal opposition.⁶⁴ The NEPA process used to implement Sandy recovery projects demonstrates the value of using NEPA as a public engagement framework that can help project proponents improve the design of projects and build public support for projects, in ways that minimize potential challenges that can delay project implementation at later stages in the process. At Glen Canyon Dam, stakeholder engagement through the NEPA process even resulted in the development of a new, preferred alternative for the Long-term Experimental and Management Plan that ultimately became the final, selected alternative. Similarly, for the DWH restoration projects,

the NEPA framework can help project proponents address the tradeoffs of different project alternatives in a transparent fashion with interested stakeholders.

Consider climate change in NEPA analysis.

As agencies evaluate alternatives presented in NEPA environmental studies, they should consider the best available science about future conditions, including sea-level-rise projections and other climate change impacts. This will help agencies improve the project design, develop mitigation measures, and ensure that the projects will be more resilient to the future conditions that are anticipated along these areas of the coast. In the Gulf Coast context, this analysis requires adequate consideration of sea-level rise for all project alternatives, including the no-action alternative. Louisiana in particular has already seen a striking amount of land loss — due in part to sea-level rise and subsidence already observed from past management activities, channelization of waterways, and oil and gas development and the state’s Coastal Master Plan projects dramatic land loss in the future with additional sea-level rise.⁶⁵ Large areas of what used to be wetlands, which provided protection against flooding and storm surges, have now been converted to open water. If states fail to account for this historical and projected land loss in the no-action alternative, they will not fully account for the full benefits of taking action to preserve, maintain, and rebuild coastal ecosystems. Accounting for future climate risks will also better insulate the states and federal agencies from potential legal challenge of their environmental review documents.⁶⁶ The California WaterFix project shows how environmental review can be used to analyze how a project will enhance the adaptability and resiliency of a region and demonstrate these benefits as compared to the no-action alternative. The state’s environmental review showed that the project would reduce future climate impacts to the state’s water supply and Delta ecosystems thus justifying implementation of the project over the status quo.

Account for degraded environmental conditions in NEPA analysis.

Historical baselines could be used in NEPA environmental analyses to account for the degraded current environmental conditions of some Gulf Coast watersheds. NEPA's environmental review process requires that agencies establish a "baseline" of the affected environment against which the impacts (positive or negative) of the project alternatives are analyzed.⁶⁹ Typically, the impacts of the proposed action are compared with the current conditions of the project area.⁷⁰ Using current conditions as a baseline, however, creates challenges for environmentally beneficial projects designed to remedy historical harms to dynamic coastal ecosystems. In the Gulf context, current environmental conditions in many coastal areas have been heavily degraded by past activities, and these ecosystems were further degraded by the DWH oil spill. These cumulative impacts over many decades have contributed to the need for ecosystem restoration.⁷¹ Thus, the restoration that is being pursued may in some cases be designed to restore ecosystems to historical pre-degraded conditions, rather than to just pre-spill conditions. NEPA environmental review documents, however, have not always considered the full historical context of environmental impacts in a particular project area, although agencies are not prevented from doing so or from using historical baselines instead of current conditions.⁷² With restoration projects in particular, this context is useful for ensuring that the project is designed to more fully rehabilitate ecosystems with a long history of environmental degradation.⁷³ For example, the purpose of the sediment diversion projects is to rebuild land that was eroded over time by the cumulative impacts of the levee system, oil and gas activities, coastal storms, and the oil spill. If current degraded conditions are used as the environmental baseline, the state may be hindered in its goal of rebuilding the historic ecosystems that characterized these watersheds. The pre-levee

condition of the Barataria Bay, for example, could be considered as an historical baseline against which to evaluate the project's benefits and impacts.

Use programmatic approaches for evaluating suites of projects at the watershed scale.

Agencies involved in Gulf restoration have already sought to utilize programmatic approaches to environmental review, in order to reflect the interconnected, ecosystem-based nature of environmental injuries and the restoration needs in the region. For example, the NRDA Trustees adopted a Programmatic Damage Assessment and Restoration Plan and Programmatic Environmental Impact Statement (PEIS) and other agencies are specifically authorized to adopt and use the PEIS to comply with NEPA.⁷⁴ In doing so, federal and state agencies working in the Gulf Coast region can more effectively ensure that future projects align with a larger comprehensive vision. This approach also helps to simplify the environmental analyses needed to authorize individual projects. When analyzing individual projects, agencies can "tier" off of the programmatic EIS (i.e., building off the analysis of a PEIS to simplify and narrow the analysis for a specific project considered in the PEIS) thereby speeding the environmental review process and avoiding duplication of effort.⁷⁵ States and federal agencies should continue to take advantage of this tool to ensure that large-scale plans and environmental review analyses are used appropriately to plan and analyze options for individual restoration projects and to provide pathways for reducing the time and effort needed to conduct project-specific environmental review documents. Federal agencies should also learn from this approach to determine how similar programmatic assessments can be used to support future large-scale restoration efforts or other complex projects in the future.

RESTORE Council's NEPA Climate Change Requirements

The RESTORE Council's NEPA procedures require consideration of climate change impacts in environmental review documents.⁶⁷ And existing restoration plans and programmatic environmental reviews already support consideration of climate change and sea-level rise.⁶⁸ These considerations should be included when evaluating individual restoration projects to ensure that projects will be sustainable in the face of climate change projections for the region.

NRDA Trustees' Programmatic Plan and EIS (PDARP/PEIS)

The wide-ranging scale of injuries to the Gulf Coast region resulting from the DWH spill event created a challenge for the federal and state trustee agencies (Trustees) who are responsible for assessing the extent of injuries and developing a plan for the restoration needed to make the public whole. In response to this challenge, the NRDA Trustees opted to take a programmatic approach to the damage assessment and restoration planning required under the Oil Pollution Act (OPA), and the environmental review required by NEPA. The Trustees' Programmatic Damage Assessment and Restoration Plan (PDARP) provides long-term direction on how to identify, evaluate, and select future restoration projects, rather than identifying specific restoration projects to undertake. By taking a programmatic and ecosystem-based approach, the Trustees enabled future flexibility in project selection as scientific understanding of the impacts of the spill and needed restoration actions improves. Additionally, the programmatic approach allows for more efficient future planning and environmental review processes because the PEIS can be incorporated by reference when completing environmental review documents for specific projects, rather than duplicating all this existing analysis.

The California WaterFix example shows how programmatic assessments and project staging can be used to permit early phases of a project, while final project details are worked out. While this approach presents some potential legal risk,⁷⁶ it can help to advance permitting and environmental review for some components of a project while other aspects of a project's design are finalized.

In addition, Glen Canyon Dam illustrates how a programmatic EIS can be used to benefit decision-making and ensure efficient use of agency time and resources. The Long-term Experimental and Management Plan (LTEMP) and EIS is a comprehensive plan that will govern operations and management at Glen Canyon Dam for a 20-year period. The LTEMP superseded the previous approach, which used standalone environmental reviews for individual adaptive management "experiments" that prevented holistic decisionmaking and delayed implementation of operational changes at the dam. Where possible, given available data and predictive capabilities (e.g., investments in scientific modeling), DWH project proponents should similarly consider using the NEPA review process to analyze a wide range of operational changes (or "experiments") that could be made to a project over a significant management time span (for example,

10 or 20 years). This will provide project managers with more flexibility to undertake different adaptive management approaches, as conditions change on the ground, to maximize the environmental benefits of the project and minimize its impacts.

Support and fund staff time for agencies to engage in pre-consultation with project proponents.

Where feasible, funding should be provided to federal agencies to support staff time to engage in early and iterative consultation with project proponents during initial stages of project design. Early consultation can help regulators build familiarity with the proposed project and can help project designers identify potential regulatory pitfalls that can be avoided or minimized with design adjustments. This is particularly important for innovative or complex projects, which require regulators to build an understanding of the purpose and goal of the project and the interconnections between different project components. Early consultation can also help the project proponents identify baseline data collection needs and develop research methodologies for addressing the environmental questions that will arise at later stages of environmental review and permitting. With the California WaterFix, the state is providing funding to federal

agencies to offset the costs of pre-consultation with state agencies.⁷⁷ The California Department of Water Resources has found this pre-consultation critical to the timely completion of an EIS and project permitting. With the Sandy recovery projects, no additional funding was available to support pre-consultation and participation in the Federal Review and Permitting Team (FRPT) meetings. However, agencies found that the meetings created efficiencies and reduced duplication of effort across agencies, offsetting the expenditure of time needed to participate in meetings.

Create permitting and environmental review coordinating teams.

Similar to the Federal Review and Permitting teams that were set up by HUD to improve coordination during the Sandy recovery, key regulatory agencies (U.S. Army Corps of Engineers, Environmental Protection Agency, and National Marine Fisheries Service) with permitting authority over DWH restoration projects should coordinate and engage with project proponents at early phases of project design, data collection, and analyses. With the Sandy recovery projects, in addition to technical teams that provided technical guidance on the funding, design, and integration of recovery projects, permitting teams were also set up to coordinate early input from regulatory agencies that will be needed to approve environmental review documents and issue permits at later stages. The Sandy grantees found that early and frequent coordination with federal agencies helped them identify relevant studies and data for completing technical analyses needed for environmental review and permitting. Permitting team meetings also provided a venue for building understanding among all parties about the legal and regulatory requirements and timelines for specific projects. This helped agencies develop timelines for staging concurrent or sequenced, rather than serial, review of permits and environmental review documents, and will ultimately save time and reduce late-in-the-game objections to projects.

Adaptive Management

Address scientific uncertainty using adaptive management approaches.

With scientific knowledge constantly growing and improving, many agencies are moving toward longer and more detailed EISs, and a desire for near-perfect understanding of the complex processes that underlie environmental impacts of proposed actions.⁷⁸ However, the nature of science is such that in some cases, the answers cannot be fully known until a project is complete and operational. NEPA is designed to allow agencies to proceed even if there is scientific uncertainty as to the impacts of a proposed action, so long as those uncertainties are acknowledged and minimized.⁷⁹ Adaptive management approaches can be a useful tool for addressing scientific uncertainties. Adaptive management plans are developed with procedures for making operational changes based upon monitoring to minimize potential negative impacts that cannot be fully known at the EIS and permitting stages of a project. Essentially, adaptive management can serve as the mitigation measures that must be identified as part of NEPA review.⁸⁰ This may be an important approach for particularly large-scale, innovative, or complex Gulf restoration efforts, such as the sediment diversion projects. There is support for the use of adaptive management approaches in CEQ's NEPA regulations,⁸¹ case law,⁸² and existing Gulf restoration planning and review documents.⁸³ The Glen Canyon Dam Long-term Experimental and Management Plan provides insights in how to use adaptive management to reduce the environmental impacts from operating a project. An adaptive management approach is being used to address competing demands on managing water flows and energy production and was used to comply with NEPA and underlying statutory requirements for a future 20-year period.⁸⁴

Demonstrate success and use lessons to inform future management and investments.

The sheer scale of restoration, as well as the potential for innovation within individual Gulf restoration projects, creates an opportunity to learn and inform future investment. Federal agencies, working in coordination with the states and other research organizations, have the ability to create protocols, share data, and develop lessons to provide benefits well beyond the Gulf Coast region. Agencies can help establish consistent indicators, monitoring programs, and reporting mechanisms for assessing cumulative benefits across a portfolio of projects. Rarely does this opportunity arise, where funding exists to simultaneously develop and implement numerous restoration projects within a defined area, which will be seen in the Gulf Coast region over the next 15 years. Yet preliminary research shows that these types of coordinated investments can produce up to ten times the benefit of individual projects.⁸⁵ Effort should be dedicated to measuring the cumulative benefits of Gulf restoration projects, within a watershed, or geographical area of coastline or open ocean. Federal and state agencies should also work to ensure that projects are using similar metrics in their monitoring plans, even where projects are approved through different funding streams, and these metrics should include ecosystem service values.⁸⁶ To ensure that data and results are comparable across the range of projects and geographies, federal agencies should work with the states to adopt a common protocol for assessing economic and ecosystem-service benefits. This can also help federal agencies update benefit-cost analyses to inform the implementation of future projects and to adequately capture the ecosystem-service values of natural-system restoration projects.

Identify funding mechanisms or partnerships to support long-term monitoring and adaptive management

Developing funding mechanisms will also be critically important for ensuring long-term monitoring of DWH projects and for implementing adaptive management approaches. Although some DWH funding was allocated, sufficient funding may not be available to support robust, long-term monitoring and adaptive management of implemented restoration projects.⁸⁷ The Glen Canyon Dam case demonstrates that adaptive management requires a long-term commitment and funding for research, monitoring, and iterative planning to inform decision making over time. In both the Glen Canyon Dam and California WaterFix contexts, the project proponents rely on user fees (electricity user fees and water user fees) to support monitoring and research (at least in part). User fees will not be an available source of funding for DWH projects. The Sandy recovery projects demonstrate how to use public-private partnerships to support or augment long-term monitoring and research. In particular, the Living Breakwaters project in New York Harbor includes an adaptive management component; however, there is no long-term funding source to pay for this work. Thus, the state and local grantees are working to identify state and local sources and are developing partnerships with research institutions and non-governmental organizations to craft monitoring programs that are financially feasible to implement (a “non-Cadillac” monitoring program). For example, with the Living Breakwaters project, the state is partnering with the New York Harbor Foundation Billion Oyster Project on a potential long-term monitoring program for the constructed reefs.⁸⁸

Collect and share lessons learned to improve future adaptive management plans.

Optimizing management approaches requires experimentation, iterative learning, and decision-making structures that account for competing public interests in the project's outcomes. This is especially important because a number of the projects being considered are the first of their kind in the nation at this scale (such as the sediment diversion projects in Louisiana) and many of these projects will rely on an adaptive management approach. The experimentation in adaptive management presented by DWH projects could provide an opportunity to inform and improve upon these types of approaches in the future, especially those designed to deal with climate change and sea-level rise. Federal agencies could develop lessons on how to use adaptive management to ease permitting, minimize project impacts, and alleviate regulatory concerns about uncertain impacts. Lessons from the Gulf Coast projects could also be used to update federal agency guidance on adaptive management for restoration projects.⁸⁹

Project proponents of DWH projects could learn from the experience of Glen Canyon Dam. In its more than 20-year history, the Glen Canyon Dam's adaptive management structure integrated both iterative learning based upon scientific data and analysis of the consequences of management decisions, as well as a process for the robust stakeholder engagement needed to balance multiple interests. For example, those developing adaptive management programs for sediment diversions projects could learn from how the Glen Canyon Dam's "experimental" adaptive management actions were designed to vary water releases (or "flows") from the dam in order to encourage the maintenance and rebuilding of downstream sandbars and reduce impacts on recreational users and endangered species.

Conclusion

The ambitious restoration effort that is being pursued throughout the Gulf Coast region presents a unique opportunity for implementing innovative, large-scale restoration projects that enhance the resilience of coastal ecosystems and communities. Federal agencies will have important roles to play in ensuring the successful implementation of restoration plans in each of the states affected by the oil spill. Efforts to improve coordination and simplify regulatory processes, where legally feasible, will be needed to ensure implementation at the pace, scale, and level of ambition needed for a successful recovery. Federal and state agencies in the Gulf Coast region can draw on examples from other regions where agencies have worked within existing legal frameworks to improve coordination and streamline regulatory processes. As explored in the case studies that follow, these examples provide useful lessons that can be applied to facilitate a more efficient, effective, and engaged DWH recovery process in Gulf Coast states. In turn, the restoration efforts and lessons learned in the Gulf region can benefit other large-scale projects, restoration or otherwise, throughout the nation.

Endnotes

- 1 DEEPWATER HORIZON NATURAL RESOURCE DAMAGE ASSESSMENT TRUSTEES [hereinafter NRDA TRUSTEES], DEEPWATER HORIZON OIL SPILL: FINAL PROGRAMMATIC DAMAGE ASSESSMENT AND RESTORATION PLAN AND FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT 1-2 (Feb. 2016) [hereinafter FINAL PDARP/PEIS], *available at* <http://www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan>.
- 2 NRDA TRUSTEES, PLAN FOR DEEPWATER HORIZON OIL SPILL NATURAL RESOURCE INJURY RESTORATION: AN OVERVIEW 5 (Apr. 2016) [hereinafter 2016 NRDA Plan], *available at* http://www.gulfspillrestoration.noaa.gov/sites/default/files/wp-content/uploads/Overview_04-07-16_final-508.pdf.
- 3 TX. TRS. IMPLEMENTATION GRP. DRAFT 2017 RESTORATION PLAN/ENVIRONMENTAL ASSESSMENT: RESTORATION OF WETLANDS, COASTAL, AND NEARSHORE HABITATS; AND OYSTERS 70, 78-79 (May 2017), *available at* http://www.gulfspillrestoration.noaa.gov/sites/default/files/NRDA%20Texas%20TIG%20Draft%202017%20Restoration%20Plan%20and%20Environmental%20Assessment_%20FINAL%20SIGNED%20and%20508.pdf.
- 4 L.M. Carter et al., *Chapter 17: Southeast and the Caribbean*, in U.S. GLOBAL CLIMATE CHANGE RESEARCH PROGRAM, CLIMATE CHANGE IMPACTS IN THE UNITED STATES: THE THIRD NATIONAL CLIMATE ASSESSMENT 404 (Jerry M. Melillo, Terese “T.C.” Richmond & Gary W. Yohe, eds., 2014) [hereinafter THIRD NATIONAL CLIMATE ASSESSMENT], *available at* http://s3.amazonaws.com/nca2014/low/NCA3_Climate_Change_Impacts_in_the_United%20States_LowRes.pdf?download=1.
- 5 *Id.* at 406.
- 6 *Id.* at 400.
- 7 *Id.* (50 percent of that increase in cost is attributed to climate change).
- 8 Frederick Bloetscher et al., *Climate Change and Transportation in the Southeast USA*, in CLIMATE OF THE SOUTHEAST UNITED STATES: VARIABILITY, CHANGE, IMPACTS, AND VULNERABILITY ch. 6, p. 114 (Keith T. Ingram et al., eds., 2013) (National Climate Assessment Regional Technical Input Report Series), *available at* https://www.cakex.org/sites/default/files/documents/Climate%20of%20the%20Southeast%20United%20States_0.pdf.
- 9 *Id.* at ch. 17. (citing B. H. Strauss., R. Ziemiński, J. L. Weiss & J. T. Overpeck, *Tidally Adjusted Estimates of Topographic Vulnerability to Sea Level Rise and Flooding for the Contiguous United States*, ENVTL. RESEARCH LETTERS 7 (2012 [doi:10.1088/1748-9326/7/1/014033]). Louisiana has one of the highest rates of relative sea-level rise in the world, and accounts for the vast majority of wetland loss in the United States. Krista L. Jankowski, Torbjörn E Törnqvist & Anjali M Fernandes, *Vulnerability of Louisiana’s Coastal Wetlands to Present-day Rates of Relative Sea-level Rise*, 8 NATURE COMM’NS (2017) (doi:10.1038/ncomms14792) (indicating that Louisiana accounts for 40% of wetlands in the contiguous U.S., but for 80% of the total wetland loss). Loss of sediment delivery and increasing rates of subsidence are major contributors to the coastal land loss challenges in the region: “While a variety of factors have contributed to Louisiana’s wetland loss problem, the fundamental culprit is the isolation of the sediment-delivery system (the Mississippi River) from its delta plain and the adjacent coastal zone due to the construction of flood-protection levees. As a result, the majority of the sediment carried by this system is funneled into the deep waters of the Gulf of Mexico, rather than offsetting the naturally occurring high subsidence rates.” Jaap H. Nienhuis et al., *The Geological Soc’y of America (GSA), A New Subsidence Map for Coastal Louisiana*, 27 GSA TODAY 58 (2017) (doi: 10.1130/GSATG337GW.1). This 2017 GSA study calls for an update of Louisiana’s subsidence map and rates, finding that the current subsidence rates (9 millimeters (mm) per year +/- 1 mm) are consistent with the “worst case scenario” rates used throughout the 21st century.
- 10 THIRD NATIONAL CLIMATE ASSESSMENT, *supra* n.4, at 398 (citing Louisiana Comprehensive Master Plan for a Sustainable Coast, 2012).

- 11 The Gulf Coast region will receive \$20.8 billion total in funds from three different sources over the next 15 years, in settlement of criminal and civil claims under the Clean Water Act and Oil Pollution Act brought against British Petroleum (BP), Transocean, and other companies responsible for causing the oil spill. First, Section 311(b)(v) (33 U.S.C. § 1321) of the Clean Water Act (CWA) prohibits the “discharge of oil or hazardous substances . . . into or upon the navigable waters of the United States, [or] adjoining shorelines . . . in such quantities as may be harmful.” Under CWA Section 311, owners, operators, and persons in charge of vessels, onshore, and offshore facilities responsible for a discharge are subject to civil penalties. Second, \$8.8 billion in penalties were assessed based upon an assessment of damages to natural resources under the Oil Pollution Act (33 U.S.C. §§ 2701 *et seq.*). A third source of funding (\$2.544 billion), in settlement of criminal penalties from BP and Transocean Deepwater, is being administered by the National Fish and Wildlife Foundation through the Gulf Environmental Benefit Fund.

- 12 THE NATURE CONSERVANCY (TNC), *OUR FUTURE GULF: THE NATURE CONSERVANCY’S RECOMMENDATIONS FOR RESTORATION IN THE GULF OF MEXICO* 4 (2016) [hereinafter TNC, *OUR FUTURE GULF*], *available at* <https://www.nature.org/ourinitiatives/regions/northamerica/areas/gulfofmexico/restoration/our-future-gulf.pdf>. In 2010, another study estimated that the coastal counties and parishes in Alabama, Mississippi, Louisiana, and Texas alone had a population of approximately 12 million, had assets valued at about \$2 trillion, and were producers of \$634 billion in annual gross domestic product. *THIRD NATIONAL CLIMATE ASSESSMENT*, *supra* n.4, at 400.

- 13 STATE OF LA., *NATIONAL DISASTER RESILIENCE COMPETITION: PHASE II APPLICATION 2* (Oct. 27, 2015) [hereinafter LA. NDRC PHASE II], *available at* http://www.doa.la.gov/OCDDRU/NDRC/NDRC_PII_Final_Exlmg.pdf.

- 14 *Id.*

- 15 *MISS. RIVER CITIES & TOWNS INITIATIVE, 2018 FEDERAL POLICY PLATFORM OF THE MAYORS ALONG THE MISSISSIPPI RIVER: RECOVERY, RESILIENCE, AND THE PURSUIT TO CONSERVE AND RESTORE THE NATION’S MOST VALUABLE WATERWAY 2* (2018), *available at* https://static1.squarespace.com/static/5845a70859cc6819f2dfdb9e/t/5aa83e44419202c43911af11/1520975429363/Platform+One-Pagers+%282018-02-20T23_10_28.632%29.pdf.

- 16 *Id.*

- 17 *Id.*

- 18 OFFICE OF COASTAL MGMT., NAT’L OCEANIC & ATMOSPHERIC ADMIN., *NOAA REPORT ON THE U.S. OCEAN AND GREAT LAKES ECONOMY: REGIONAL AND STATE PROFILES 7-8* (2017), *available at* <https://coast.noaa.gov/data/digitalcoast/pdf/econ-report-regional-state.pdf>.

- 19 *Id.*

- 20 TNC, *OUR FUTURE GULF*, *supra* n.12, at 3 (citing U.S. Fish and Wildlife Service).

- 21 *Id.*

- 22 *See generally* GULF COAST ECOSYSTEM RESTORATION COUNCIL, *RESOURCES AND ECOSYSTEMS SUSTAINABILITY, TOURIST, OPPORTUNITIES, AND REVIVED ECONOMIES OF THE GULF COAST STATES ACT (RESTORE ACT) INITIAL FUNDED PRIORITIES LIST 1*, *available at* https://www.restorethegulf.gov/sites/default/files/FPL_forDec9Vote_Errata_04-07-2016.pdf; *see also supra* n.3.

- 23 The Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act of 2012 (RESTORE Act) was passed by Congress as part of the Moving Ahead for Progress in the 21st Century (MAP-21) Act, Pub. L. No. 112-141, Div. A, Tit. I, Subtit. F (§§ 1601-08) [hereinafter RESTORE Act].

- 24 The RESTORE Council includes representatives from all five states appointed by each state’s governor and the Secretaries of the U.S. Department of Agriculture (USDA), the Army (with a designee from the Army Corps of Engineers or Corps), Department of Commerce (with a designee from the National Oceanic and Atmospheric Administration or NOAA), Homeland Security, the Interior, and the Administrator of the Environmental Protection Agency.
- 25 This portion is known as the “Direct Component.” Eligible activities include:
- (I) Restoration and protection of the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast region.
 - (II) Mitigation of damage to fish, wildlife, and natural resources.
 - (III) Implementation of a federally approved marine, coastal, or comprehensive conservation management plan, including fisheries monitoring.
 - (IV) Workforce development and job creation.
 - (V) Improvements to or on State parks located in coastal areas affected by the Deepwater Horizon oil spill.
 - (VI) Infrastructure projects benefitting the economy or ecological resources, including port infrastructure.
 - (VII) Coastal flood protection and related infrastructure.
 - (VIII) Planning assistance.
 - (IX) Administrative costs
- 33 U.S.C. § 1321(t)(1). Recipients may also use RESTORE funds under this “Direct Component” for activities to promote tourism and seafood. The U.S. Department of the Treasury administers this component directly to the states (and in some cases, local governments and parishes that are eligible as direct recipients — as specified in the RESTORE Act).
- 26 This portion is known as the “Council-selected Component” and must be consistent with the RESTORE Council’s Comprehensive Plan for “restor[ing] and protect[ing] the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast region.” 33 U.S.C. § 1321(t)(2)(D)(i)(I). The Plan, which the RESTORE Act requires the RESTORE Council to develop, must provide for prioritization of projects that meet one or more criteria specified in statute, including projects that can provide the greatest restoration or protection impact, projects that are large-scale in nature, projects that are already included in existing Gulf state comprehensive restoration plans, and projects that restore long-term resiliency. 33 U.S.C. § 1321(t)(2)(D)(iii).
- 27 33 U.S.C. § 1321(t)(3). This portion is known as the “Spill Impact Component,” and based upon formula criteria laid out in statute, this Component has been allocated to the Gulf states in the following proportions: Louisiana (34.59%), Alabama (20.4%), Mississippi (19.07%), Florida (18.36%), and Texas (7.58%). Gulf Coast Ecosystem Restoration Council, RESTORE Act Spill Impact Component Allocation, 80 Fed. Reg. 58,417 (Sept. 29, 2015) (codified at 40 C.F.R. pt. 1800).
- 28 Research is supported through the National Oceanic and Atmospheric Administration and “Centers of Excellence” created in each state with RESTORE Act Funds. RESTORE Act, *supra* n.23, at §§ 1604-1605.
- 29 The Natural Resource Damage Assessment (NRDA) process under the Oil Protection Act is designed to determine the extent of injuries to natural resources that occur as a result of an oil spill incident and to develop a plan for restoration that will address those injuries. See 33 U.S.C. § 2706.
- 30 Oil Pollution Act (OPA) of 1990, Pub. L. No. 101-380 (1990), 33 U.S.C. §§ 2701 *et seq.*
- 31 As required by OPA, federal and state agency Trustees are designated in the wake of a spill event in order to act on behalf of the public’s interest in overseeing the assessment of damages from the spill event, and determining the restoration and compensation needed to make the public whole. 33 U.S.C. § 2706(b).

- 32 NFWF administers funds that have been deposited into the Gulf Environmental Benefit Fund (GEBF) pursuant to the settlement of criminal cases against BP and Transocean. Over \$2.5 billion will ultimately be provided for restoration projects and efforts through the GEBF, with about half of this funding allocated for Louisiana. *See Gulf Environmental Benefit Fund*, NAT'L FISH & WILDLIFE FED'N, <http://www.nfwf.org/gulf/Pages/home.aspx> (last visited May 11, 2018).
- 33 States are required to develop plans in order to secure funds through the Direct and Spill Impact Components of RESTORE funding, and states also contribute to NRDA restoration planning efforts as members of their state-specific TIGs. Some states are also using existing (like Louisiana) — or developing new (like Alabama) — comprehensive restoration plans to emphasize coastal resilience and guide their project planning across multiple funding streams. For more information on this subject, see Appendix D of this report.
- 34 The National Environmental Policy Act (NEPA, Pub. L.No. 91-190 (1970), 42 U.S.C. §§ 4321 *et seq.*) was enacted in 1970 to improve decisionmaking and transparency relating to the environmental impacts of major federal decisions and actions. NEPA is a procedural statute, meaning that it does not dictate any particular outcome or decision, but rather requires federal agencies to follow certain procedures that help ensure a full accounting and consideration of environmental and other impacts of proposed actions.
- 35 The Clean Water Act (CWA) provides a basis for regulating discharges of pollutants into waters of the United States. Projects that may affect navigation or that involve dredging or filling in wetlands or waterways require permits from the Army Corps of Engineers under Section 404 of the CWA. 33 U.S.C. § 1344 (“Permits for dredged or fill material”).
- 36 Rivers and Harbors Act of 1899, 33 U.S.C. §§ 401 *et seq.* Similar to the CWA Section 404 requirements, any activity that obstructs “navigable waters” requires a permit from the Corps under Section 10 of the Rivers and Harbors Act (RHA). Projects that could affect existing Corps civil works projects (i.e., flood protection or water infrastructure projects constructed by the Corps with federal funds) also require a permit under Section 408 of the RHA.
- 37 The Endangered Species Act (ESA) prohibits the “taking” (harming, harassing, or destruction of habitat) of any species that has been listed by the Secretary of Interior (acting through U.S. Fish and Wildlife Service) or Secretary of Commerce (acting through NOAA National Marine Fisheries Service) as being endangered or threatened (at risk of becoming endangered in the foreseeable future). 16 U.S.C. § 1538.
- 38 The Marine Mammal Protection Act (MMPA) restricts activities that could result in the “take” (injury, harassment, or killing) of any marine mammal, and gives NOAA authority to issue permits for such activities under limited circumstances. 16 U.S.C. §§ 1372, 1374.
- 39 The Magnuson-Stevens Act of 1976, 16 U.S.C. §§ 1801-1891d, provides for the conservation and management of the nation’s fisheries and limits actions that have an adverse effect on essential fish habitats (EFHs). For actions that could adversely affect EFHs, project proponents must consult with NOAA National Marine Fisheries Service regarding how to minimize potential impacts. 16 U.S.C. § 1855.
- 40 The National Historic Preservation Act (NHPA, originally enacted as Pub. L. No. 89-665 (1966)) provides for the identification of historic properties on a National Register and requires that any potential adverse effects to historic properties from proposed projects or federal actions be avoided, minimized, and mitigated. 54 U.S.C. § 306108.
- 41 For more information on the DWH-related funding programs, including the legal basis and requirements, and the status of planning and projects advanced through the funding programs, see Appendix B of this report.

- 42 See Appendix C of this report for a discussion of the federal laws and regulations that will be triggered by many of the Gulf Coast restoration projects.
- 43 The definition for adaptive management presented is from the Trustees' Monitoring and Adaptive Management Procedures and Guidelines Manual. FINAL PROGRAMMATIC DAMAGE ASSESSMENT AND RESTORATION PLAN/PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT (PDARP/PEIS) DEEPWATER HORIZON NATURAL RESOURCE DAMAGE ASSESSMENT TRUSTEES, MONITORING AND ADAPTIVE MANAGEMENT PROCEDURES AND GUIDELINES MANUAL, VERSION 1.0 1 (Dec. 2017) (Appendix to the Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the Deepwater Horizon Oil Spill).
- 44 Press Release, Office of the Governor John Bel Edwards, CPRA Signs Landmark MOU with Trump Admin for 2-year federal permitting of Mid-Barataria Sediment Diversion Project (Jan. 26, 2018), <http://gov.louisiana.gov/index.cfm/newsroom/detail/1247>; Press Release, U.S. Gen. Servs. Admin., Federal Permitting Improvement Steering Council reduces permitting schedule for proposed coastal restoration project by almost two years (Apr. 19, 2018), <https://content.govdelivery.com/accounts/USGSA/bulletins/1ead-0cf?reqfrom=share>.
- 45 The "One Federal Decision" framework is a product of Executive Order (EO) 13807 — Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure (Aug. 15, 2017), 82 Fed. Reg. 40,463 (Aug. 24, 2017). The purpose of EO 13807 is to streamline the environmental review and permitting processes for infrastructure projects. To fulfill this purpose, the EO calls federal agencies to proceed concurrently under a "One Federal Decision" framework to review and permit infrastructure projects in two years (i.e., from notice of intent to record of decision for an environmental impact statement). It is important to note that, in addition to the MOU, the diversion project was placed on the Federal Permitting Dashboard under the Fixing America's Surface Transportation (FAST) Act (42 U.S.C. §§ 4370m *et seq.*) in January 2017. Enacted in 2015, the FAST Act similarly established expedited environmental review and permitting coordination requirements for infrastructure projects. EO 13807 and the FAST Act while similar in purpose have some distinct legal requirements, where only the former explicitly includes the two-year requirement.

The Mid-Barataria MOU provides that project implementation under the FAST Act will continue consistent with the objectives of EO 13807; however, it does not legally bind signatories to a two-year requirement (i.e., The MOU states that "the Parties will use their best efforts to strive to meet the goals and objectives [of EO 13807]" [p. 3, n.2]; "the United States is implementing FAST-41, and seeks to implement applicable provisions of EO 13807" [p.3]). Specifically, given that the date of EO 13807 (August 15, 2017) post-dated the start of environmental review and permitting for this project (June 22, 2016), EO 13807 cannot apply retroactively to the sediment diversion project. As of June 12, 2018, the Federal Permitting Dashboard shows that the estimated "Target Completion" date for this project (November 16, 2020) is approximately 32 months after the MOU was signed. *Mid-Barataria Sediment Diversion*, PERMITTING DASHBOARD: FED. INFRASTRUCTURE PROJECTS, <https://www.permits.performance.gov/permitting-projects/mid-barataria-sediment-diversion> (last visited June 12, 2018).

- 46 See, e.g., Mark Schleifstein, *Major Louisiana coastal restoration project won't get permits before 2022, Corps of Engineers says*, TIMES-PICAYUNE (Mar. 15, 2017), https://www.nola.com/environment/index.ssf/2017/03/mid-barataria_sediment_diversi.html; Stephanie Rigel, *Bogged Down: With billions on the way, regulatory and financial issues are slowing down the pace of major restoration projects along Louisiana's vanishing coast*, GREATER BATON ROUGE BUS. REPORT (Mar. 29, 2017), <https://www.businessreport.com/business/bogged-billions-way-regulatory-financial-issues-slowing-pace-major-restoration-projects-along-louisianas-vanishing-coast>. At one time, according to the Federal Permitting Dashboard, the project timeline for the Mid-Barataria sediment diversions, as proposed by the Army Corps of Engineers, could take up to eight years; however, as the dashboard has been updated to reflect the expedited timeline, that estimate has since been removed from the dashboard and was not archived for citation purposes.

- 47 Press Release, U.S. Gen. Servs. Admin., Federal Permitting Improvement Steering Council reduces permitting schedule for proposed coastal restoration project by almost two years (Apr. 19, 2018), <https://content.govdelivery.com/accounts/USGSA/bulletins/1ead0cf7reqfrom=share>.
- 48 The sediment diversion projects are large-scale, complex projects designed to restore historical natural systems by replenishing freshwater and sediment from the Mississippi and Atchafalaya Rivers to areas of the Mississippi Delta region that have experienced significant wetland loss and conversion to open water over decades as a result of engineered projects channeling the rivers. One of the challenges with these projects involves uncertainty around how the sediment diversions might affect dolphins that have migrated into areas that were historically coastal wetlands but are now more saline, open-water areas; thus, the proposed diversions would trigger MMPA review under normal circumstances.

On February 9, 2018, the Bipartisan Budget Act of 2018 (Pub. L. No. 115-123) was signed into law, which included provisions granting the sediment diversion projects a waiver under the Marine Mammal Protection Act. The provision (Bipartisan Budget Act of 2018, Division B, § 20201) provides as follows:

- (a) In recognition of the consistency of the Mid- Barataria Sediment Diversion, Mid-Breton Sound Sediment Diversion, and Calcasieu Ship Channel Salinity Control Measures projects, as selected by the 2017 Louisiana Comprehensive Master Plan for a Sustainable Coast, with the findings and policy declarations in section 2(6) of the Marine Mammal Protection Act (16 U.S.C. 1361 *et seq.*, as amended) regarding maintaining the health and stability of the marine ecosystem, within 120 days of the enactment of this section, the Secretary of Commerce shall issue a waiver pursuant to section 101(a)(3)(A) and this section to section 101(a) and section 102(a) of the Act, for such projects that will remain in effect for the duration of the construction, operations and maintenance of the projects. No rulemaking, permit, determination, or other condition or limitation shall be required when issuing a waiver pursuant to this section.
- (b) Upon issuance of a waiver pursuant to this section, the State of Louisiana shall, in consultation with the Secretary of Commerce: (1) To the extent practicable and consistent with the purposes of the projects, minimize impacts on marine mammal species and population stocks; and (2) Monitor and evaluate the impacts of the projects on such species and population stocks.
- 49 In 2017, the RESTORE Council approved a Funded Priorities List: Comprehensive Plan Commitment and Planning Support (FPL-CPS). The FPL-CPS provides limited funding over a five-year period in order to enhance collaboration, coordination, engagement, and use of best available science to support Council members (including states) in their identification of future investments and projects that will maximize the “achievement of Gulf-wide restoration goals” and support a holistic approach to restoration. In justifying this provision of funding, the Council recognizes:

A major challenge to Gulf-wide ecosystem restoration is coordinating efforts within each state, among Council members, among stakeholders within the Gulf region, and across funding streams. Adding to the challenge is the fact that, prior to this FPL, no designated funding stream existed to support Council Member efforts to plan and coordinate restoration activities under the Council-Selected Restoration Component. Historically, Council members have had to rely upon general, tax-generated or appropriated funds to support their involvement in Council-Selected Restoration Component, including FPL development and the Comprehensive Plan update. The funds approved in this FPL will provide Council members with funding from the *Deepwater Horizon* oil spill settlement. By supporting collaboration and leveraging among these programs, the Council will be able to produce the greatest on-the-ground restoration results possible.

- RESTORE COUNCIL, FUNDED PRIORITIES LIST: COMPREHENSIVE PLAN COMMITMENT AND PLANNING SUPPORT 1-2 (2017) [hereinafter 2017 FPL-CPS], available at https://www.restorethegulf.gov/sites/default/files/2017_CPS_FPL_Final.pdf. One of the purposes of the FPL-CPS funding is to “facilitate long-term planning and leveraging efforts across funding streams,” and the Council “anticipates that the CPS funds will be used to collaborate with the Deepwater Horizon NRDA Trustees, NFWF’s GEBF, and/or other relevant funding programs.” *Id.* at 2-3.
- 50 GULF COAST ECOSYSTEM RESTORATION COUNCIL, COMPREHENSIVE PLAN UPDATE 2016: RESTORING THE GULF COAST’S ECOSYSTEM AND ECONOMY (2016) (stating the RESTORE Council’s intent to “[s]ponsor and participate in meetings and workshops to foster coordination and collaboration among members and our restoration partners (e.g., NRDA and NFWF)” in 2017 and 2018), available at https://www.restorethegulf.gov/sites/default/files/CO-PL_20161208_CompPlanUpdate_English.pdf.
- 51 The U.S. Department of the Treasury has indicated that — at least for the RESTORE Direct Component funds (which Treasury directly oversees and distributes) — states are not prevented from financing eligible projects through bonds or other debt obligations and seeking reimbursement from Treasury through the Direct Component. However, Treasury encourages states to notify Treasury in advance of these plans (e.g., by including a debt financing plan in their multiyear plan, which is a prerequisite for states to develop before receiving any Direct Component funds). And Treasury cautions that any pre-award costs including debt financing are at the applicant’s own risk; pre-award costs can only be approved if they would have been allowable if incurred under a grant award — and can only be approved through a notice of award or other post-award notification. For more information, see U.S. DEP’T OF THE TREASURY, RESTORE ACT FREQUENTLY ASKED QUESTIONS RELATING TO THE DIRECT COMPONENT PROGRAM 11-14, (May 2, 2017), available at [https://www.treasury.gov/services/restore-act/Documents/FAQs/RESTORE%20Act%20Direct%20Component%20FAQs%20\(May%202017%20Update\).pdf](https://www.treasury.gov/services/restore-act/Documents/FAQs/RESTORE%20Act%20Direct%20Component%20FAQs%20(May%202017%20Update).pdf).
- 52 Resilience has been defined by the U.S. Department of Housing and Urban Development (one of the primary funders of disaster recovery efforts) as “the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions.” For example, the State of Louisiana was one of the winners of the National Disaster Resilience Competition and received \$92.6 million to implement the Louisiana Strategic Adaptations for Future Environments (or LA-SAFE) program to help communities experiencing significant land loss transition inland and also support inland communities to enhance services to enable them to “resettle” populations migrating inland. For more details, see LA. NDRC PHASE II, *supra* n.13.
- 53 See generally U.S. ARMY CORPS OF ENGINEERS, COASTAL RISK REDUCTION AND RESILIENCE: USING THE FULL ARRAY OF MEASURES (Sep. 2013).
- 54 COASTAL PROT. & RESTORATION AUTH., STATE OF LA., LOUISIANA’S COASTAL MASTER PLAN FOR A SUSTAINABLE COAST (June 2, 2017) [hereinafter LA. COASTAL MASTER PLAN], available at http://coastal.la.gov/wp-content/uploads/2017/04/2017-Coastal-Master-Plan_Web-Single-Page_CFinal-with-Effective-Date-06092017.pdf.
- 55 The Coastal Master Plan refers to these types of risk reduction measures for the built environment as “nonstructural solutions,” including floodproofing, structural elevation, and buyouts. *Id.* The State of Louisiana is implementing the Louisiana Strategic Adaptations for Future Environments project (LA-SAFE) exploring opportunities to resettle communities migrating away from vulnerable coastal areas and invest “reshape” communities in higher ground areas of the state to take in these resettling populations by making investments in infrastructure and services in “high-and-dry.” LA. STRATEGIC ADAPTATIONS FOR FUTURE ENV’T’S, <https://lasafe.la.gov/> (last visited May 11, 2018).
- 56 LA. COASTAL MASTER PLAN, *supra* n.54, at 129 & ch. 5 (implementation strategy). Other funding sources include the Gulf of Mexico Energy Security Act (GOMESA) and Coastal Wetlands Planning, Protection, and Restoration Act (CWPR). *Deepwater Oil Spill Restoration*, COASTAL PROT. & RESTORATION AUTH. (CPRA), STATE OF LA., <http://coastal.la.gov/deepwater-horizon-oil-spill-content/oil-spill-overview/> (last visited June 6, 2017). The plan notes that although different funding streams are subject to different requirements, “CPRA considers oil spill funding sources holistically in an effort to maximize the use of these dollars” and the state aims to implement spill restoration projects that are consistent with the Coastal Master Plan as much as possible.

- 57 LA. REV. STAT. 49:214.5.4(I) (“Any monies received by the state for violations pursuant to section 311 of the Federal Water Pollution Control Act, 33 U.S.C. 1321; R.S. 30:2025(E)(1) and (2); and R.S. 30:2001 et seq., including R.S. 30:2071 et seq., associated with the Deepwater Horizon oil spill . . . shall be deposited and credited by the treasurer to the Coastal Protection and Restoration Fund for integrated coastal protection efforts, including coastal restoration, hurricane protection, and improving the resiliency of the Louisiana Coastal Area affected by the Deepwater Horizon oil spill.”).
- 58 LA. REV. STAT. 49:214.5.4(G).
- 59 La. Exec. Order No. JBE 2016-09, 42 La. Reg. 507 (Apr. 4, 2016).
- 60 *Id.*
- 61 Beginning in 2014, the National Disaster Resilience Competition, administered by the U.S. Department of Housing and Urban Development (HUD), awarded \$1 billion in funding (as a Community Development Block Grant) for disaster recovery and long-term community resilience through a two-phased competition process. All states and local governments with major disasters declared in 2011, 2012, and 2013 were eligible to participate in the competition. Selected applicants were required to connect their proposals to the eligible disaster from which they were recovering and also conduct a benefit-cost analysis. In January 2016, HUD announced 13 competition winners. For more information about the competition, including awarded funding amounts and projects by state, see *National Disaster Resilience*, U.S. DEP’T OF HOUSING & URBAN DEV. (2018), <https://www.hudexchange.info/programs/cdbg-dr-resilient-recovery/>.
- 62 Press Release, U.S. Dep’t of Housing & Urban Dev., HUD Awards \$1 Billion Through National Disaster Resilience Competition, (Jan. 21, 2016), available at <https://archives.hud.gov/news/2016/pr16-006.cfm>.
- 63 *Learn about who we are.*, LA. STRATEGIC ADAPTATIONS FOR FUTURE ENV’TS, <https://lasafe.la.gov/about-us/> (last visited May 11, 2018).
- 64 *See infra* n.66.
- 65 In 2018, Houston amended its floodplain ordinance to require structures in the 500-year floodplain be elevated to 2 feet above the 500-year flood elevation level. HOUSTON CODE OF ORDINANCES, ch. 19.
- 66 Past litigation regarding adequacy of NEPA analysis had led CEQ under the Obama administration to develop guidance (now rescinded under the Trump administration) on how to consider climate change in reviews. The CEQ guidance reasoned that “[c]limate change is a fundamental environmental issue, and its effects fall squarely within NEPA’s purview.” Memorandum from Council on Envtl. Quality (CEQ), Executive Office of the President to Heads of Federal Departments and Agencies, Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews 2 (Aug. 1, 2016) [hereinafter CEQ, Climate Guidance], available at https://ceq.doe.gov/docs/ceq-regulations-and-guidance/nepa_final_ghg_guidance.pdf. That guidance directed federal agencies on how to account for greenhouse gas emissions relating to a project (i.e., the project’s effect on climate change) and for the effects of climate change on a project, and that the “current and projected future state of the environment without the proposed action (i.e., the no action alternative) represents the reasonably foreseeable affected environment, and this should be described based on authoritative climate change reports” CEQ, Climate Guidance, *supra*, at 21. Recent cases also suggest an increasing trend of courts to find that NEPA requires an analysis of climate change impacts (at least of a proposed project’s impact on the climate, using greenhouse gas emissions as an indicator). See *Sierra Club v. Fed. Energy Regulatory Com’n (FERC)*, 867 F.3d 1357, 1374 (D.C. Cir. 2017) (holding that FERC was required in its EIS to quantify the downstream greenhouse gas emissions that would result from burning the natural gas transported by the pipeline under review, or explain specifically why it could not quantify those emissions); *WildEarth*

- Guardians v. U.S. Bureau of Land Mgm't (BLM), 870 F.3d 1222, 1237-38 (10th Cir. 2017) (finding that BLM's reliance on the assumption that opening coal leases for bidding was not likely to affect overall current or future coal consumption, based on a "perfect substitution" economic theory, was an abuse of discretion); *see also* Jessica Wentz, Columbia Law Sch. Sabin Ctr. for Climate Change Law, *Considering the Effects of Climate Change on Natural Resources in Environmental Review and Planning Documents: Guidance for Agencies and Practitioners* 20-21 (Sept. 2016) (academic paper) (citing case law to support a more general premise that agencies are required to consider future conditions when assessing the environmental impacts of a proposed action, and citing additional cases recognizing that climate change analysis may fall within the proper scope of NEPA review).
- 67 National Environmental Policy Act Implementing Procedures and Categorical Exclusions, Gulf Coast Ecosystem Restoration Council, Issuance of Final Procedures, 80 Fed. Reg. 25,680 at § 13(h)(19) (May 5, 2015).
- 68 For example, the Programmatic Environmental Assessment (PEA) that the RESTORE Council produced to accompany its first Comprehensive Restoration Plan discusses climate change in several contexts: the Environmental Setting (i.e., affected environment) chapter and the Environmental Effects of Alternatives chapter. For example, in discussing the affected environment and resources, the PEA notes that coastal wetlands are particularly vulnerable to human activity as well as climate change, and that climate change "threatens to accelerate the loss of these habitats," which has already been significant due to river channelization and levees, dredging, erosion, storm surge, oil and gas activities, and land subsidence. In assessing cumulative effects on wetlands and surface water resources, the PEA again includes climate change in the ongoing and future factors and actions that will affect wetlands, and notes that the proposed Plan (the adoption of which was under consideration in developing the PEA) would allow for the selection of projects that restore and protect wetlands. Of note, the PEA discusses impacts of climate change in the context of the *no-action alternative as compared to the proposed action*. Under no-action, the PEA states that "ongoing impacts of climate change to the human and natural environment in the Gulf Coast region will continue and may increase if projects that could have been implemented by the Council are not completed by others." It identifies Intergovernmental Panel on Climate Change and U.S. Global Change Research Program findings on projected impacts of climate change on coastal systems. In contrast, the PEA points out that community resiliency was among the Restoration Objectives proposed by the Council for funding activities, and with regard to specific projects, NEPA analysis will consider whether proposed actions incorporate adaptation and resiliency. GULF COAST ECOSYSTEM RESTORATION COUNCIL, FINAL PROGRAMMATIC ENVIRONMENTAL ASSESSMENT FOR THE INITIAL COMPREHENSIVE PLAN: RESTORING THE GULF COAST'S ECOSYSTEM AND ECONOMY 25, 57 & 66-67 (Aug. 2013), available at <https://www.restorethegulf.gov/sites/default/files/documents/images/Initial%20Comprehensive%20Plan%20Programmatic%20Environmental%20Assessment.pdf>.
- 69 This baseline comes in the form of an agency's description of the "affected environment." *See* Western Watersheds Project v. Bureau of Land Mgm't, 552 F. Supp. 2d 1113, 1126-37 (D. Nev. 2008) ("In analyzing the affected environment, NEPA requires the agency to set forth the baseline conditions." (citing Half Moon Bay Fishermans' Marketing Ass'n v. Carlucci, 857 F.2d 505, 510 (9th Cir. 1988))).
- 70 Agencies and courts have interpreted this requirement to varying temporal and spatial degrees, but in most cases, agencies have described the "affected environment" with reference to the conditions existing at the time when the project or other federal action is being considered.
- 71 In the Gulf region, a large number of federal and state projects since the early and mid-1900s, in combination with sea-level rise and major storms, have caused coastal land loss and ecosystem degradation over the years. For example, the construction of levees since the 1930s has changed the natural flow of water and sediment in the region, resulting in Barataria Bay being starved of sediment that previously provided the materials necessary for natural wetland creation and maintenance.

- 72 See Erin E. Prahler et al., *It All Adds Up: Enhancing Ocean Health by Improving Cumulative Impacts Analysis in Environmental Review Documents*, 33 STAN. ENVTL. L.J. 351, 377-84 (2014) (discussing different approaches to setting the baseline for cumulative impacts analysis: historical, existing conditions, and future conditions; noting benefits and drawbacks of different approaches; and noting that scientists typically recommend a historical baseline, which can often better capture a full picture of ecosystem decline or recovery).
- 73 Already, there are examples from environmental review documents of plans relating to Gulf restoration that include some historical discussion of environmental conditions See, e.g., FINAL PDARP/PEIS, *supra* n.1, at 3-9 (“Historically, a balance was maintained between wetland formation and loss through erosion, as the river periodically changed course within the delta. However, the amount of sediment reaching these wetlands has been greatly reduced because of Mississippi River management practices adopted for the important purposes of maintaining navigation and flood control. Additionally, dredging canals for oil and gas exploration and pipelines, sea-level rise, and subsidence all contribute to the ongoing loss of coastal wetlands. Since the 1930s, Louisiana has lost 1,880 square miles of land through erosion, with the risk of losing an additional 1,750 square miles of land in the next 50 years if actions are not taken to reduce this threat (CPRA 2012).”); see also DEEPWATER HORIZON OIL SPILL ALA. TR. IMPLEMENTATION GRP., FINAL RESTORATION PLAN I AND ENVIRONMENTAL IMPACT STATEMENT: PROVIDE AND ENHANCE RECREATIONAL OPPORTUNITIES 4.1-4.2 (Apr. 2017), available at <http://www.gulfspillrestoration.noaa.gov/sites/default/files/DWH%20Oil%20Spill%20AL%20TIG%20Final%20Restoration%20Plan%20I%20and%20EIS%20Provide%20and%20Enhance%20Recreational%20Opportunities.pdf> (“Removal of sediments from the Gulf Coast through dredging has accelerated beach erosion because less sediment is then available for natural deposition. Additionally, along the bayside of the Gulf Coast, the construction of bulkheads is thought to have resulted in increased erosion — more than 6 miles of intertidal beaches have been lost since 1900 (Douglass, 2012).”).
- 74 CEQ regulations on adoption: 30 C.F.R. § 1506.3. Each agency, however, may have more specific guidance/policies/regulations regarding when/how other agency NEPA documents can be adopted. It is the easiest for cooperating agencies to adopt another agency’s NEPA document rather than other non-lead or cooperating agencies.
- 75 Council on Env’tl. Quality, Final Guidance for Effective Use of Programmatic NEPA Reviews, 79 Fed. Reg. 76,986 (Dec. 23, 2014), <https://www.gpo.gov/fdsys/pkg/FR-2014-12-23/pdf/2014-30034.pdf>; NRDA plans note the benefits of the PEIS to expediting environmental review for specific projects: “When a federal agency prepares a programmatic NEPA analysis, such as a programmatic EIS, the agency may ‘tier’ subsequent narrower environmental analyses on site-specific plans or projects from the programmatic analysis (40 C.F.R. §§ 1502.20, 1508.28). Federal agencies are encouraged to tier subsequent narrower analyses from a programmatic NEPA analysis to eliminate repetitive discussions of the same issues and to focus on the issues ripe for decision at each level of environmental review (40 C.F.R. § 1502.20).” NRDA TRUSTEES, EXECUTIVE SUMMARY, FINAL PHASE IV EARLY RESTORATION PLAN/ENVIRONMENTAL ASSESSMENT (Sept. 2015), available at http://www.gulfspillrestoration.noaa.gov/sites/default/files/wp-content/uploads/Final-Exec-Summ_phase-IV.pdf.
- 76 See the accompanying case study on the California WaterFix project for a detailed discussion of the legal challenges to the programmatic approach used for environmental review and permitting of the project.
- 77 The Department of the Interior was granted authority to accept “donations” for these types of activities under the Fish and Wildlife Coordination Act (16 U.S.C. § 661). This authority was extended to the National Oceanic and Atmospheric Administration through Reorganization Plan No. 4 of 1970, Section 1.
- 78 See Bradley C. Karkkainen, *Toward a Smarter NEPA: Monitoring and Managing Government’s Environmental Performance*, 102 COLUM. L. REV. 903, 917-19 (2002) (“Measuring the ‘adequacy’ of EISs against NEPA’s sweeping statutory language, courts have found occasion to reverse agencies for failure to examine reasonably foreseeable alternatives or mitigation measures, neglect of

reasonably foreseeable direct, indirect, or cumulative effects of the proposed action, and failure to consider evidence relevant to the assessment of environmental impacts. For the risk averse agency manager, then, the safer course is to err on the side of providing too much information, so as to produce a ‘litigation proof; or ‘bullet proof’ document capable of withstanding any conceivable legal challenge. In a recent CEQ-sponsored survey, agency managers indicated that this is precisely the course most agencies take. As a result, the typical EIS runs to hundreds of pages in length, and is costly and time consuming to produce. A recent study for the Federal Highway Administration — one of the leading generators of EISs — found that on average an EIS required 3.6 years to complete, with some taking as long as twelve years. And the average completion time actually grew longer over the thirty-year period of the survey, from 2.2 years in the 1970s to 5 years in the 1990s.” (citations omitted)).

- 79 CEQ regulations set out a four-part requirement for agencies if scientific information is unavailable or incomplete and cannot be obtained without significant costs (40 C.F.R. § 1502.22):
- Include a statement that the information is incomplete or unavailable,
 - State the relevance of the missing information for evaluating “reasonably foreseeable significant adverse impacts on the human environment,”
 - Summarize existing “credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts . . .,” and
 - Evaluate the impacts “based upon theoretical approaches or research methods generally accepted in the scientific community.”
- 80 See 40 C.F.R. § 1508.20 (“Mitigation includes . . . (d) [r]educing or eliminating the impact over time by preservation and maintenance operations during the life of the action.”).
- 81 NEPA requires agencies to identify potential mitigation measures for reducing or avoiding adverse environmental effects of proposed actions. However, in some cases, potential adverse effects may not be entirely known or able to be anticipated due to the novelty of these projects. In these instances, agencies may be able to rely on a robust adaptive management and monitoring approach to satisfy NEPA’s mitigation requirements. This is inherently allowed by CEQ’s definition of “mitigation,” which includes (among other definitions) “[r]educing or eliminating the impact over time by preservation and maintenance operations during the life of the action.” 40 C.F.R. § 1508.20(d) (emphasis added).
- 82 See *Theodore Roosevelt Conservation P’ship v. Salazar*, 616 F.3d 497, 336 (D.C. Cir. 2010) (“By setting forth both fixed mitigation measures and an adaptive management plan, the Record of Decision amply fulfills NEPA’s mandate to discuss mitigation measures Allowing adaptable mitigation measures is a responsible decision in light of the inherent uncertainty of environmental impacts, not a violation of NEPA.”).
- 83 For example, the PDARP developed by the NRDA Trustees — and with which all restoration plans developed by the individual states’ NRDA Trustees must be consistent — includes adaptive management and monitoring as one of the five restoration goals that guide all subsequent restoration efforts. And unlike the other four programmatic restoration goals, the adaptive management and monitoring goal is a sort of “umbrella” goal that overarches all other goals and all restoration types and approaches. Mississippi’s Gulf Coast Restoration Plan also provides for an adaptive management approach whereby monitoring efforts of restoration projects feed back into the science-data tool, MCERT, to improve future decisionmaking on restoration projects
- 84 See generally BUREAU OF RECLAMATION & NAT’L PARK SERV., U.S. DEP’T OF THE INTERIOR, LONG-TERM EXPERIMENTAL AND MANAGEMENT PLAN FINAL ENVIRONMENTAL IMPACT STATEMENT (Oct. 2016), available at <http://tempeis.anl.gov/documents/final-eis/>; see also Notice of Availability for the Final Environmental Impact Statement for the Long-term Experimental and Management Plan for the Operation of Glen Canyon Dam, Page, Arizona, 89 Fed. Reg. 69,850 (Oct. 7, 2016) (“The need for the proposed Federal action stems from the need to

use scientific information developed since the 1996 ROD to better inform the public of Department of the Interior decisions on dam operations and other management and experimental actions so that the Secretary may continue to meet statutory responsibilities for protecting downstream resources for future generations, conserving species listed under the Endangered Species Act, avoiding or mitigating impacts on National Register of Historic Places — eligible historic properties, and protecting the interests of American Indian tribes, while meeting obligations for water delivery and the generation of hydroelectric power.”).

- 85 Thomas M. Neeson et al., *Enhancing Ecosystem Restoration Efficiency Through Spatial and Temporal Coordination*, 112 PROCEEDINGS OF THE NAT'L ACAD. OF SCIS. OF THE UNITED STATES OF AM. 6236-6241 (May 12, 2015), <http://www.pnas.org/content/112/19/6236>.
- 86 Ecosystem services or natural-resource services are defined in the PDARP/PEIS as “the functions performed by a natural resource for the benefit of another natural resource and/or the public. For example, a beach provides nesting habitat for sea turtles and recreational opportunities for people. Other ecological examples include nutrient cycling, water purification, food production for species, and habitat provision. Other recreational services include wildlife viewing, fishing, boating, nature photography, education, and hiking.” FINAL PDARP/PEIS, *supra* n.1, at 34.
- 87 The NRDA allocations for each restoration area included specific proportions for “Monitoring, Adaptive Management, and Administrative Oversight,” which is one of the five goals identified in the PDARP. The Louisiana restoration area will receive over \$250 million (of its total NRDA funds over time) for adaptive management, monitoring, and administrative oversight, while the Texas restoration area will receive \$7 million and each of the other three state restoration areas will receive \$30 million for adaptive management, monitoring, and administrative oversight. *See generally Gulf Spill Restoration, Restoration Areas*, NAT'L OCEANIC & ATMOSPHERIC ADMIN., <http://www.gulfspillrestoration.noaa.gov/restoration-areas> (last visited June 12, 2018). Many of the states have also requested RESTORE (Bucket 3) funding for monitoring efforts as well, and the RESTORE Council’s State Expenditure Plan (Bucket 3 funding) Guidelines require that the SEPs developed by each state include, among other elements, a description of “the mechanisms that will be used to monitor and evaluate the outcomes of the project, program, or activity.” RESTORE COUNCIL, OIL SPILL IMPACT COMPONENT: STATE EXPENDITURE PLAN GUIDELINES 10 (Mar. 17, 2016), *available at* https://restorethegulf.gov/sites/default/files/SEP-Guidelines__Approved-20160317.pdf.
- 88 *Learn More About the Living Breakwaters Project*, N.Y. GOV.’S OFFICE OF STORM RECOVERY, <https://stormrecovery.ny.gov/learn-more-about-living-breakwaters-project> (last visited May 11, 2018); *see also* JESSICA GRANNIS ET AL., GEORGETOWN CLIMATE CENTER, REBUILDING WITH RESILIENCE: LESSONS FROM THE REBUILD BY DESIGN COMPETITION AFTER HURRICANE SANDY 46 (2017), *available at* <http://www.rebuildbydesign.org/data/files/504.pdf>.
- 89 NOAA recently released guidance on how to develop adaptive management plans for NRDA-funded projects. FINAL PROGRAMMATIC DAMAGE ASSESSMENT AND RESTORATION PLAN/PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT (PDARP/PEIS) DEEPWATER HORIZON NATURAL RESOURCE DAMAGE ASSESSMENT TRUSTEES, MONITORING AND ADAPTIVE MANAGEMENT PROCEDURES AND GUIDELINES MANUAL, VERSION 1.0 1 (Dec. 2017) (Appendix to the Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the Deepwater Horizon Oil Spill), *available at* http://www.gulfspillrestoration.noaa.gov/sites/default/files/2018_01_TC_MAM_Procedures_Guidelines_Manual_12-2017_508_c.pdf. DOI also produced adaptive management guidance from the Glen Canyon Dam experience to inform future practices across the agency. BYRON K. WILLIAMS, ROBERT C. SZARO & CARL D. SHAPIRO, ADAPTIVE MGMT. WORK GRP., U.S. DEP’T OF THE INTERIOR, ADAPTIVE MANAGEMENT: THE U.S DEPARTMENT OF THE INTERIOR TECHNICAL GUIDE (2009), *available at* <https://www2.usgs.gov/sdc/doc/DOI-%20Adaptive%20ManagementTechGuide.pdf>.

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